

WHAT IS CLAIMED IS:

Duval
1. A system for managing rack operation, in which a worksite delivers an article to a customer using an assembled rack, so as to enable its disassembly, with a plurality of 5 rack components stocked at a management center, and an empty rack after delivery is collected from said worksite to said management center to be repeatedly used, said system comprising:

a specification unit which specifies first rack 10 components required for delivery of a first article and second rack components that are not required for delivery of said first article yet required for collecting a second article when said first article is delivered to said customer and said second article is collected from said customer; 15 and

an instruction unit which instructs a delivery procedure and a collection procedure of said article using said first rack components and said second rack components specified by said specification unit, to said worksite.

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2. The system for managing rack operation according to claim 1, wherein said rack components are a pallet where an article is loaded, a plurality of supports detachably fitted to said pallet, and a top covering said plurality 25 of supports, or shock absorbing members disposed between

~~said supports and said article.~~

3. The system for managing rack operation according to
claim 1, wherein said first rack components are supplied
5 from said management center to a production site, assembled
together with said first article at said production site
to be stored in a sales-use warehouse, and are shipped
together with said first article from said sales-use
warehouse to said worksite.

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4. The system for managing rack operation according to
claim 3, wherein said instruction unit instructs said
management center to deliver said first rack components to
said production site.

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5. The system for managing rack operation according to
claim 1, wherein said instruction unit includes,
a confirmation unit which manages said rack components
collected from said worksite and confirms whether said second
20 rack components are stocked at a rack collection center that
delivers said rack components when stocked more than a
predetermined number to said management center; and
a rack delivery instruction unit which instructs said
rack collection center to deliver said second rack components
25 to said worksite when it is confirmed by said confirmation

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unit that said rack collection center stocks said second rack components.

6. The system for managing rack operation according to
5 claim 5, wherein, when it is confirmed by said confirmation unit that said rack collection center does not stock said second rack components, said rack delivery instruction unit instructs said management center to deliver said second rack components together with said first rack components to said 10 rack collection center.

7. The system for managing rack operation according to claim 1, wherein said instruction unit instructs said worksite to collect said second article using third rack components, that can be used for delivering said first article and collecting said second article, and also using said second rack components after said first article is delivered with said first rack components.

20 8. The system for managing rack operation according to claim 1, wherein said instruction unit includes,
a first instruction unit which instructs said worksite to deliver said first article using said first rack components and collect any rack components except said third 25 rack components, that can be used for delivering said first

article and collecting said second article after the delivery
is finished; and

a second instruction unit which instructs said
worksite to collect said second article using said third
5 rack components and said second rack components.

9. The system for managing rack operation according to
claim 1, wherein both of said first article and said second
article are image formation devices.

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10. The system for managing rack operation according to
claim 1, wherein said first article is an image formation
device, and said second article is any device other than
said image formation device.

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11. The system for managing rack operation according to
claim 10, wherein said device other than said image formation
device is any one of a self-propelled device, a
non-self-propelled device, a device that does not function
20 singly, components forming a device, a container with liquid,
gas or a solid burned to produce heat or power, and an empty
container, or any substance to be conveyed consisting of
a solid burned to produce heat or power, non-food/drinks
or food/drinks.

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14. The method of managing rack operation according to
claim 12, wherein said first rack components are supplied
from said management center to a production site, assembled
together with said first article at said production site
5 to be stored in a sales-use warehouse, and are shipped
together with said first article from said sales-use
warehouse to said worksite.

15. The method of managing rack operation according to
10 claim 14, wherein the instructing step includes a step of
instructing said management center to deliver said first
rack components to said production site.

16. The method of managing rack operation according to
15 claim 12, wherein the instructing step includes,
a confirming step of managing said rack components
collected from said worksite and confirming whether said
second rack components are stocked at a rack collection
center that delivers said rack components when stocked more
20 than a predetermined number to said management center; and
a rack delivery instructing step of instructing said
rack collection center to deliver said second rack components
to said worksite when it is confirmed in the confirming step
that said rack collection center stocks said second rack
25 components.

17. The method of managing rack operation according to
claim 16, wherein, the rack delivery instructing step
includes a step of instructing said management center to
5 deliver said second rack components together using said first
rack components to said rack collection center when it is
confirmed in the confirming step that said rack collection
center does not stock said second rack components.

10 18. The method of managing rack operation according to
claim 12, wherein the instructing step includes a step of
instructing said worksite to collect said second article
using third rack components, that can be used for delivering
said first article and collecting said second article, and
15 also using said second rack components after said first
article is delivered with said first rack components.

19. The method of managing rack operation according to
claim 12, wherein the instructing step includes,
20 a first instructing step of instructing said worksite
to deliver said first article using said first rack
components and collect rack components except said third
rack components, that can be used for delivering said first
article and collecting said second article after the delivery
25 is finished; and

a second instructing step of instructing said worksite to collect said second article using said third rack components and said second rack components.

5 20. The method of managing rack operation according to claim 12, wherein both of said first article and said second article are image formation devices.

10 21. The method of managing rack operation according to claim 12, wherein said first article is an image formation device, and said second article is any device other than said image formation device.

15 22. The method of managing rack operation according to claim 21, wherein device other than said image formation device is any one of a self-propelled device, a non-self-propelled device, a device that does not function singly, components forming a device, a container with liquid, gas or a solid burned to produce heat or power, and an empty 20 container, or any substance to be conveyed consisting of a solid burned to produce heat or power, non-food/drinks or food/drinks.

12. A method of managing rack operation, in which a worksite
delivers an article to be delivered to a customer using an
assembled rack so as to enable disassembly with a plurality
of rack components stocked at a management center, and an
empty rack after delivery is collected from said worksite
to said management center to be repeatedly used, said method
comprising:

a specifying step of specifying first rack components
required for delivery of a first article and second rack
components that are not required for delivery said first
article yet required for collecting a second article when
said first article is delivered to said customer and said
second article is collected from said customer; and

an instructing step of instructing a delivery
procedure and a collection procedure of said article using
said first rack components and said second rack components
specified in the specifying step, to said worksite.

13. The method of managing rack operation according to
claim 12, wherein said rack components are a pallet where
an article is loaded, a plurality of supports detachably
fitted to said pallet, and a top covering said plurality
of supports, or shock absorbing members disposed between
said supports and said article.

23. A program for managing rack operation, with which a worksite delivers an article to be delivered to a customer using an assembled rack so as to enable disassembly with a plurality of rack components stocked at a management center,
5 and an empty rack after delivery is collected from said worksite to said management center to be repeatedly used, said program comprising:

a specifying sequence for specifying first rack components required for delivery of a first article and
10 second rack components that are not required for delivery of said first article yet required for collecting a second article when said first article is delivered to said customer and said second article is collected from said customer; and

15 an instructing sequence for instructing a delivery procedure and a collection procedure of said article using said first rack components and said second rack components specified in the specifying step, to said worksite.

20 24. A multistage rack management system, which manages a multistage rack assembled by a plurality of rack components so as to be disassembled and joins a plurality of racks to be repeatedly used to each other, said system comprising:

a management unit which manages said multistage rack
25 in use based on information from a plurality of production

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sites which produce self-propelled devices, non-self-propelled devices, devices that do not function singly, and main bodies or components of products to be conveyed each as a part forming a device, and pack the devices
5 or components in said multistage rack to deliver, and also based on information from a prespecified relay point that reassembles said multistage racks received from said respective production sites and delivers said reassembled multistage racks each formed with the main body and the
10 components.

25. The multistage rack management system according to claim 24, wherein said rack is formed with a pallet where an article is loaded, a plurality of supports detachably fitted to said pallet, and a top covering said plurality of supports, or shock absorbing members disposed between said supports and said article, and said multistage rack is formed by stacking a second rack on the upper side of said pallet of a first rack.

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26. The multistage rack management system according to claim 24, wherein said management unit includes, an operating rack management table which manages locations of said multistage racks in use and rack components
25 forming each of said multistage racks; and

a table management unit which manages contents of said operating rack management table based on information from said plurality of production sites or said relay point.

5 27. The multistage rack management system according to claim 26, wherein, when assembly of a multistage rack with articles of the same type is notified from any of said production sites, said table management unit registers said multistage rack into said operating rack management table.

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28. The multistage rack management system according to claim 27, wherein, when a plurality of racks are assembled to form a multistage rack or multistage racks are reassembled, said table management unit registers said multistage rack 15 into said operating rack management table, or updates the information concerning said multistage racks registered into said operating rack management table based on barcode information obtained by reading key barcodes attached to said racks forming said multistage rack.

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29. The multistage rack management system according to claim 27, wherein, when reassembly of said multistage racks is notified from said relay point, said table management unit updates the information concerning said multistage 25 racks registered in said operating rack management table.

30. The multistage rack management system according to
claim 29, wherein, when a plurality of racks are assembled
to form a multistage rack or multistage racks are reassembled,
said table management unit registers said multistage rack
into said operating rack management table, or updates the
information concerning said multistage racks registered in
said operating rack management table based on barcode
information obtained by reading key barcodes attached to
said racks forming said multistage rack.

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31. A multistage rack management method in which a multistage rack by being assembled with a plurality of rack components so as to be disassembled and joining a plurality of racks to be repeatedly used to each other is managed, said method comprising the step of:

managing said multistage racks in use based on information from a plurality of production sites which produce self-propelled devices, non-self-propelled devices, devices that do not function singly, and main bodies or components of products to be conveyed each as a part forming a device, and pack the devices or components in said multistage rack to deliver, and also based on information from a prespecified relay point that reassembles said multistage racks received from said respective production sites and delivers said reassembled multistage racks each

formed with the main body and the components.

32. The multistage rack management method according to
claim 31, wherein said rack is formed with a pallet where
5 an article is loaded, a plurality of supports detachably
fitted to said pallet, and a top covering said plurality
of supports, or shock absorbing members disposed between
said supports and said article, and said multistage rack
is formed by stacking a second rack on the upper side of
10 said pallet of a first rack.

33. The multistage rack management method according to
claim 31 further comprising the step of:

managing the contents of an operating rack management
15 table which manages locations of said multistage racks in
use and rack components forming each of said multistage racks
based on information from said plurality of production sites
or said relay point.

20 34. The multistage rack management method according to
claim 33, wherein, when assembly of a multistage rack with
articles of the same type is notified from any of said
production sites, said multistage rack is registered into
said operating rack management table.

35. The multistage rack management method according to
claim 34, wherein, when a plurality of racks are assembled
to form a multistage rack or multistage racks are reassembled,
said multistage rack is registered into said operating rack
5 management table, or the information concerning said
multistage racks registered in said operating rack
management table is updated based on barcode information
obtained by reading key barcodes attached to said racks
forming said multistage rack.

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36. The multistage rack management method according to
claim 34, wherein, when reassembly of said multistage racks
is notified from said relay point, the information concerning
said multistage racks registered in said operating rack
15 management table is updated.

37. The multistage rack management method according to
claim 36, wherein, when a plurality of racks are assembled
to form a multistage rack or multistage racks are reassembled,
20 said multistage rack is registered into said operating rack
management table, or the information concerning said
multistage racks registered in said operating rack
management table is updated based on the barcode information
obtained by reading key barcodes attached to said racks
25 forming said multistage rack.

38. A multistage rack management program with which a multistage rack by being assembled with a plurality of rack components so as to be disassembled and joining a plurality of racks to be repeatedly used to each other is managed,
5 said multistage rack management program for making a computer execute the method of managing said multistage rack in use based on information from a plurality of production sites which produce self-propelled devices, non-self-propelled devices, devices that do not function singly, and main bodies or components of products to be conveyed each as a part forming
10 a device, and pack the devices or components in said multistage rack to deliver, and also based on information from a prespecified relay point that reassembles said multistage racks received from said respective production sites and delivers said reassembled multistage racks each
15 formed with the main body and the components.

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39. An article conveyance and storage device comprising:
21 pallet and a plurality of supports detachably fitted
20 to said pallet,

said supports including a support coupling unit, which
detachably couples at least two supports detached from said
pallet to each other adjacently in substantially parallel
with each other.

40. The article conveyance and storage device according to claim 39, wherein said support coupling unit has a projecting portion formed on one of supports to be coupled and a recessed portion that is formed on the other support
5 and is engaged with said projecting portion.

41. The article conveyance and storage device according to claim 39, wherein said support includes a fitting part, that combines a bundle of at least two supports coupled to
10 each other with another bundle of supports adjacently in substantially parallel with each other.

42. The article conveyance and storage device according to claim 39 further comprising a top which is detachably
15 fixed to the upper parts of a plurality of supports fitted to said pallet.

43. The article conveyance and storage device according to claim 42, wherein said top has top positioning units each
20 of which positions said support and said top by holding the upper part of said support when said top is fixed to the upper parts of said plurality of supports.

44. The article conveyance and storage device according to claim 43, wherein said top includes,

a lock unit which locks said top to each of said supports when said top is fixed to the upper parts of a plurality 5 of said supports so that said top will not be disengaged from said supports.

45. The article conveyance and storage device according to claim 44, wherein said lock unit has a lock hole made 10 on said support and a lock member which is slidably fixed to said top and whose edge part is fitted into said lock hole; and

springs, which energize said lock member in the direction to which said edge part of said lock member is 15 fitted into said lock hole, are formed on said lock member itself.

46. The article conveyance and storage device according to claim 45, wherein an inclined surface is formed on an 20 edge part of said lock member so that said edge part is brought into contact with an upper edge of said supports with pressure and pressurized by said upper edge when said top is pressed toward the upper parts of said supports in order to fix said top to the upper parts of said supports, said lock member 25 is moved in the direction to which said lock member is

disengaged from said lock hole against the action of said springs, and when said edge part of said lock member is positioned in said lock hole, said edge part is fitted into said lock hole by the action of said springs.

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47. The article conveyance and storage device according to claim 46, wherein an inclined guide surface, which becomes gradually higher toward a central part of said top, is formed at least a part of a periphery of said top.

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48. The article conveyance and storage device according to claim 39, wherein said pallet has fitting grooves into which the lower parts of said supports are fitted.

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49. The article conveyance and storage device according to claim 39, wherein said pallet has pins with which the lower parts of said supports are engaged.

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50. The article conveyance and storage device according to claim 39 further comprising:

article holding members each of which positions and holds said article on said pallet, wherein said article holding members can be fixed to the pallet at different positions.

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51. The article conveyance and storage device according to claim 50, wherein said article holding member includes,

a fitting part which is detachably fitted into a mounting hole formed on the surface of said pallet;

5 an article placing part on which an article is placed; and

an article positioning part which is projected upward from said article placing part, and

10 said article is loaded on said pallet through said article holding members.

52. The article conveyance and storage device according to claim 39, said support is formed with a molded product obtained by extruding resin or metal.

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53. An article conveyance and storage device comprising: a pallet and a plurality of supports detachably fitted to said pallet;

20 a shock absorber disposed between an article loaded on said pallet and each of said supports fixed to said pallet; and

a fixing unit that fixes said shock absorber to each of said support.

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54. The article conveyance and storage device according to claim 53, wherein said fixing unit includes,

a protrusion provided on either said shock absorber or said support; and

5 a fitting hole, provided on said shock absorber or said support to which said protrusion is not provided, into which said protrusion is fitted.

55. The article conveyance and storage device according
10 to claim 54, wherein said fitting hole is made on said support, and a plurality of fitting holes are formed on said support along its longitudinal direction.

56. The article conveyance and storage device according
15 to claim 53, wherein said fixing unit includes,

a groove extending along the longitudinal direction of said support; and

20 a protruding portion which is formed on said shock absorber and is fitted into said groove, and said protruding portion is provided at two or more positions apart from each other in the longitudinal direction of said shock absorber.

57. The article conveyance and storage device according to claim 56, wherein said protruding portion has
25 protrusions which are engaged in said grooves to prevent

disengagement of said protruding portion from said groove.

58. The article conveyance and storage device according to claim 53, wherein said shock absorber has at least one
5 shock absorbing member whose internal side formed through blow molding is hollow.

59. The article conveyance and storage device according to claim 53, wherein said shock absorber has a plurality
10 of shock absorbing members detachably coupled to each other in the direction of their thickness.

60. The article conveyance and storage device according to claim 53, wherein each of said supports has a support
15 coupling unit which detachably couples two supports detached from said pallet adjacently in substantially parallel with each other, and the cross section of said supports are set so that a space, in which a shock absorber fixed to at least one of said supports is accommodated, is formed inside said
20 supports.

61. The article conveyance and storage device according to claim 53 further comprising a top which is detachably fixed to the upper parts of said plurality of supports fitted
25 to said pallet.

62. The article conveyance and storage device according to claim 61, wherein said top has top positioning units each of which positions said support and said top by holding the upper part of said support when said top is fixed to the 5 upper parts of said plurality of supports.

63. The article conveyance and storage device according to claim 62, wherein said top further comprises:

a lock unit which locks said top to each of said supports
10 when said top is fixed to the upper parts of a plurality of said supports so that said top will not be disengaged from said supports.

64. The article conveyance and storage device according to claim 63, wherein said lock unit has a lock hole made on said support and a lock member which is slidably fixed to said top and whose edge part is fitted into said lock hole; and

springs, which energize said lock member in the 20 direction to which said edge part of said lock member is fitted into said lock hole, are formed on said lock member itself.

65. The article conveyance and storage device according to claim 64, wherein an inclined surface is formed on an edge part of said lock member so that said edge part is brought into contact with an upper edge of said supports with pressure
5 and pressurized by said upper edge when said top is pressed toward the upper parts of said supports in order to fix said top to the upper parts of said supports, said lock member is moved in the direction to which said lock member is disengaged from said lock hole against the action of said
10 springs, and when said edge part of said lock member is positioned in said lock hole, said edge part is fitted into said lock hole by the action of said springs.

66. The article conveyance and storage device according to claim 65, wherein an inclined guide surface, which becomes gradually higher toward a central part of said top, is formed at least a part of a periphery of said top.

67. The article conveyance and storage device according to claim 53, wherein said pallet has fitting grooves into which the lower parts of said supports are fitted.

68. The article conveyance and storage device according to claim 53, wherein said pallet has pins with which the lower parts of said supports are engaged.

69. The article conveyance and storage device according to claim 53 further comprising article holding members each of which positions and holds said article on said pallet, wherein said article holding members can be fixed to said
5 pallet at different positions.

70. The article conveyance and storage device according to claim 69, wherein said article holding member includes,
a fitting part which is detachably fitted into a
10 mounting hole formed on the surface of said pallet;
an article placing part on which an article is placed;
and
an article positioning part which is projected upward from said article placing part, and
15 said article is loaded on said pallet through said article holding members.

71. The article conveyance and storage device according to claim 53, wherein said support is formed with a molded
20 product obtained by extruding resin or metal.